

Alain Plattner  
amplattner@ua.edu  
<http://alainplattner.net>

**CV date:** April 14, 2020

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### Expertise:

Planetary crustal magnetic fields. Regional inversion of satellite magnetic data. Regional spherical-harmonic spectral analysis. Electrical resistivity tomography. Near-surface geophysics.

### Address:

Department of Geological Sciences  
University of Alabama  
Box 870338  
Tuscaloosa, AL 35487, USA

### Positions:

2018–present: Assistant Professor at the Department of Geological Sciences,  
University of Alabama, Tuscaloosa AL, USA

2014–2018: Assistant Professor at the Department of Earth and Environmental Sciences,  
California State University Fresno, Fresno CA, USA

2011–2014: Postdoctoral Researcher at the Department of Geosciences,  
Princeton University, Princeton NJ, USA

### Degrees:

2011: PhD (Dr. Sc. ETH Zurich) in Geophysics at the Institute of Geophysics, ETH Zurich, Switzerland.  
Thesis title: *Adaptive wavelet methods for geoelectric modelling and inversion*. Adviser: Prof. Hansruedi Maurer. doi: 10.3929/ethz-a-006481159

2006: Master of Science in Mathematics at the Institute of Mathematics, University of Basel, Switzerland.  
Majors: Algebraic geometry, numerical mathematics

2004: Bachelor of Science in Mathematics at the Institute of Mathematics, University of Basel, Switzerland.

### Honors and Awards:

NASA Planetary Science Early Career Award (2019)

### Publications:

\*: Undergraduate student first author

\*: Graduate student first author

*Research articles/book chapters:*

- \* M. Pacheco, **A. Plattner**, G. M. Stock, D. H. Rood, C. J. Pluhar, Surface exposure dating and geophysical investigation of the Royal Arches Meadow rock avalanche, Yosemite Valley, California, *Frontiers in Earth Science*, submitted

**A. Plattner**, C. L. Johnson (2020), GRACE and GRACE-FO magnetic field data, *Geochem. Geophys. Geosy.*, submitted

- [11] **A. Plattner** (2019), GPRPy: Open-source ground penetrating radar processing and visualization software, *The Leading Edge*, accepted
- \*[10] A. R. Robbins, **A. Plattner** (2018), Offset-electrode profile acquisition strategy for electrical resistivity tomography, *J. Appl. Geoph.*, 151:66–72, doi: 10.1016/j.jappgeo.2018.01.027
- [9] **A. Plattner**, F. J. Simons (2017), Internal and external potential field estimation from regional gradient data at varying satellite altitude, *Geophys. J. Int.*, 211(1):207–238, doi: 10.1093/gji/ggx244
- [8] **A. Plattner**, F. J. Simons (2015), High-resolution local magnetic field models for the Martian South Pole from Mars Global Surveyor data, *J. Geophys. Res.*, 120:1543–1566, doi: 10.1002/2015JE004869
- [7] C. Harig, K. W. Lewis, **A. Plattner**, and F. J. Simons (2015), A suite of software analyzes data on the sphere, *Eos Trans. AGU*, 96(6):18–22, doi: 10.1029/2015EO025851
- [6] **A. Plattner** and F. J. Simons (2015), Potential field estimation using scalar and vector Slepian functions at satellite altitude, *Handbook of Geomathematics, 2nd edition*, doi: 10.1007/978-3-642-27793-1\_64-2
- [5] F. J. Simons and **A. Plattner** (2015), Scalar and vector Slepian functions, spherical signal estimation and spectral analysis, *Handbook of Geomathematics, 2nd edition*, doi: 10.1007/978-3-642-27793-1\_30-2
- [4] **A. Plattner** and F. J. Simons (2014), Spatiospectral concentration of vector fields on a sphere, *Appl. Comput. Harmon. Anal.*, 36(1):1–22, doi: 10.1016/j.acha.2012.12.001
- [3] **A. Plattner** and F. J. Simons (2013), A spatio-spectral localization approach for analyzing and representing vector-valued functions on spherical surfaces, *Proc. SPIE 8858, Wavelets and Sparsity XV*, 88580N, doi: 10.1117/12.2024703
- [2] **A. Plattner**, H. R. Maurer, J. Vorloeper and M. Blome (2012), 3-D electrical resistivity tomography using adaptive wavelet parameter grids, *Geophys. J. Int.*, 189(1):317–330, doi: 10.1111/j.1365-246X.2012.05374.x
- [1] **A. Plattner**, H. R. Maurer, J. Vorloeper and W. Dahmen (2010), Three-dimensional geoelectric modelling with optimal work/accuracy rate using an adaptive wavelet algorithm, *Geophys. J. Int.*, 182(2):741–752, doi: 10.1111/j.1365-246X.2010.04677.x

*Extended abstracts:*

- \*[8] A. C. Mills, **A. Plattner** (2020), Regional Power Spectral Estimation with Application to Galileo Data of Ganymede, *51th Lunar and Planetary Science Conference 2019*, Abstract 2264
- [7] **A. Plattner**, C. L. Johnson (2019), Large-Scale Non-Axisymmetric Internal Structure of Mercury’s Magnetic Field, *50th Lunar and Planetary Science Conference 2019*, Abstract 1645
- [6] **A. Plattner**, C. L. Johnson (2018), Regional Modeling and Power Spectra of Mercury’s Crustal Magnetic Field, *Mercury 2018*, Abstract 6023
- [5] C. L. Johnson, **A. M. Plattner**, R. J. Phillips, L. C. Philpott, M. Kinczyk, L. Prockter (2018), The Distribution and Origin of Mercury’s Lithospheric Magnetization, *Mercury 2018*, Abstract 6052
- [4] **A. Plattner**, G. J. Golabek, F. J. Simons (2017), A spectral view of the Terra Sirenum / Cimmeria crustal magnetic field, *48th Lunar and Planetary Science Conference 2017*, Abstract 1627
- \*[3] A. R. Robbins and **A. Plattner** (2017), 2.75-D ERT: Zigzag electrode acquisition strategy to improve 2-D Profiles, *Symposium on the Application of Geophysics to Engineering and Environmental Problems 2017*, 183–187, doi: 10.4133/SAGEEP.30-007
- [2] **A. Plattner** and F. J. Simons (2015), Mars’ heterogeneous South Polar magnetic field revealed using altitude vector Slepian functions, *46th Lunar and Planetary Science Conference 2015*, Abstract 1794

- [1] **A. Plattner**, F. J. Simons, L. Wei (2012), Analysis of real vector fields on the sphere using Slepian functions, *IEEE Statistical Signal Processing Workshop (SSP)*, Abstract

*Non peer-reviewed publications:*

- [1] **A. Plattner**, M. Pacheco, (2019), A community-developed free Ground Penetrating Radar software, *Near-Surface Views, Newsletter of the Near-Surface Geophysics Technical Section of The Society of Exploration Geophysicists*, Q1 2019 Newsletter

## Talks:

\*: Undergraduate student first author

\*: Graduate student first author

*Invited/solicited conference talks:*

- \* 2.75-D ERT: Zigzag electrode acquisition strategy to improve 2-D profiles, A. R. Robbins, A. Plattner, *23rd European Meeting of Environmental and Engineering Geophysics*, Malmo, Sweden, Sep 2017 (best of SAGEEP)

High-resolution crustal magnetic field model of the Martian South Pole using altitude vector Slepian functions, A. Plattner, F. J. Simons, *Joint Mathematics Meeting*, San Antonio, TX, Jan 2015 (invited)

Planetary potential-field inversion from vectorial data: Using Slepian functions for varying satellite altitude, A. Plattner, F. J. Simons, *Joint Mathematics Meeting*, Baltimore, MD, Jan 2014 (invited)

Regional crustal field modeling from regional satellite data with varying altitude using dedicated vector Slepian functions, A. Plattner, F. J. Simons, *AGU Fall Meeting*, San Francisco, CA, Dec 2013 (invited)

Signal and Spectral Estimation on a Sphere, F. J. Simons, A. Plattner, *AMMCS 2013*, Waterloo, ON, Canada, August 2013 (invited speaker: F.J. Simons)

Vectorial Slepian functions and the estimation of the crustal magnetic field, A. Plattner, F. J. Simons, *EGU General Assembly*, Vienna, Austria, April 2013 (solicited)

*Regular conference talks:*

- \* Three-dimensional Geophysical Imaging of the Royal Arches Meadow Rock Avalanche in Yosemite Valley, California, M. Pacheco, A. Plattner, G. Stock, C. Pluhar, *AGU Fall Meeting*, San Francisco, CA, Dec 2019

Mercury's Large-Scale Non-Axisymmetric Internal Field from MESSENGER Data, A. Plattner, C. L. Johnson, *AGU Fall Meeting*, San Francisco, CA, Dec 2019

Large-Scale Non-Axisymmetric Internal Structure of Mercury's Magnetic Field, A. Plattner, C. L. Johnson, *50th Lunar and Planetary Science Conference*, The Woodlands, TX, March 2019

A spectral view of the Terra Sirenum / Cimmeria crustal magnetic field, A. Plattner, F.J. Simons, G. Golabek, *48th Lunar and Planetary Science Conference*, The Woodlands, TX, March 2017

- \* 2.75-D ERT: Zigzag electrode acquisition strategy to improve 2-D profiles, A. R. Robbins, A. Plattner, *SAGEEP*, Denver, CO, Mar 2017

The Crustal Magnetic Field of Terra Sirenum and Cimmeria, Mars. A Spectral Perspective, A. Plattner, F. J. Simons, G. Golabek, *AGU Fall Meeting*, San Francisco, CA, Dec 2016

Teaching Near-Surface Geophysics within the Matlab/Octave Community, A. Plattner, *AGU Fall Meeting*, San Francisco, CA, Dec 2016

Localized Bandlimited Inversion of Planetary Magnetic-Field Data, A. Plattner, F. J. Simons, *SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Stanford University, Stanford, CA, Jul 2015

Source field estimation from satellite data using vectorial spatio-spectrally concentrated functions, A. Plattner, F. J. Simons, *Geomathematics 2013*, Sankt Martin, Germany, April 2013

Vector-valued crustal magnetic field estimation using vector Slepian functions, A. Plattner, F. J. Simons, *AGU Fall Meeting*, San Francisco, CA, Dec 2012

Geophysical survey of the Peristeries plateau in Polis Chrysochous, Cyprus, A. Plattner, F. J. Simons, J. S. Smith, A. C. Maloof, J. Husson, *American Schools of Oriental Research Annual Meeting*, Chicago, IL, Nov 2012

Adaptive wavelet parameterization for 3d electrical resistivity tomography, A. Plattner, H. R. Maurer, *AGU Fall Meeting*, San Francisco, CA, Dec 2011

Adaptive wavelet modeling of geophysical data, A. Plattner, H. R. Maurer, J. Vorloeper and W. Dahmen, *AGU Fall Meeting*, San Francisco, CA, Dec 2009

#### *Webinar talks:*

Examples using Matlab / Octave for Experimental Design and Data Processing in a Near-surface Applied Geophysics Class, *Developing Computational Skills in the Sciences with Matlab*, April 2017  
<http://serc.carleton.edu/details/files/115169.html>

#### *Seminar talks:*

*University of South Florida, School of Geosciences, Feb 2020*

*University of Mississippi, Department of Geology and Geological Engineering, Oct 2019*

*University of Alabama, Department of Physics and Astronomy, Sep 2019*

*University of Cape Town (South Africa), Department of Geology, Sep 2018*

*NASA Goddard Space Flight Center (USA), July 2018*

*University of Siegen (Germany), Department of Mathematics, May 2018*

*University of Alabama, Department of Geological Sciences, Feb 2018*

*University of the Witwatersrand (South Africa), School of Geosciences, July 2016*

*University of British Columbia (CA), Dept. of Earth, Ocean and Atmospheric Sci., Feb 2016*

*UC Santa Cruz (USA), Earth and Planetary Sciences Department, Oct 2014*

*Princeton University (USA), Department of Geosciences, Sept 2011, Apr 2014*

*CSU Fresno (USA), Department of Earth and Environmental Science, Feb 2014*

*Princeton University (USA), Program in Appl. and Comp. Mathematics, Nov 2013*

*Rutgers (USA), Department of Earth and Environmental Sciences, Feb 2012*

*Cornell University (USA), Department of Earth and Atmospheric Sciences, Feb 2012*

*Universite de Lausanne (Switzerland), Institute de Geophysique, Nov 2009, Jan 2012*

*ETH Zurich (Switzerland), Seminar for Applied Mathematics, Dec 2010*

*ETH Zurich (Switzerland), Department of Earth Sciences, Oct 2009*

#### **Posters:**

\*: Undergraduate student first author

\*: Graduate student first author

#### *Invited conference posters:*

Ground Penetrating Radar Data Processing and Visualization using GPRPy, A. Plattner, *AGU Fall Meeting*, Washington DC, Dec 2018

*Regular conference posters:*

- \* Geophysical Investigation of the Royal Arches Meadow Rock Avalanche in Yosemite Valley - CA, M. Pacheco, A. Plattner, *GSA Cordilleran Meeting*, Portland OR, May 2019  
Mercury's Core Field: Beyond the Offset Axial Dipole, A. Plattner, C. L. Johnson, *AGU Fall Meeting*, Washington DC, Dec 2018
- \* Near Surface Geophysical Imaging of the Internal Structure of El Capitan Meadow Rock Avalanche in Yosemite National Park, California, C. Liu, A. Plattner, G. Stock, *AGU Fall Meeting*, Washington DC, Dec 2018  
Mercury's Crustal Magnetic Field from MESSENGER Data, A. Plattner, C. L. Johnson, *AGU Fall Meeting*, New Orleans, LA, Dec 2017
- \* A glimpse in the third dimension for electrical resistivity profiles, A. R. Robbins, A. Plattner, *AGU Fall Meeting*, New Orleans, LA, Dec 2017
- \* Electrical Resistivity and Ground Penetrating Radar Investigation of Presence and Extent of Hardpan Soil Layers, S. J. Thao, A. Plattner, *AGU Fall Meeting*, San Francisco, CA, Dec 2015  
Localized crustal magnetic field inversion from inner- and outer-source altitude vector Slepian functions, A. Plattner, F. J. Simons, *AGU Fall Meeting*, San Francisco, CA, Dec 2015  
Mars' Heterogeneous South Polar Magnetic Field Revealed using Altitude Vector Slepian Functions, A. Plattner, F. J. Simons, *46th Lunar and Planetary Science Conference*, The Woodlands, TX, March 2015  
High-resolution Local Crustal Magnetic Field Modeling of the Martian South Pole, A. Plattner, F. J. Simons, *AGU Fall Meeting*, San Francisco, CA, Dec 2014  
Altitude vector Slepian functions and satellite crustal magnetic field data, A. Plattner, F. J. Simons, *3rd Swarm Science Meeting*, Copenhagen, Denmark, June 2014  
Local gravity field modeling from vectorial satellite data using Slepian functions, A. Plattner, F. J. Simons, *AGU Fall Meeting*, San Francisco, CA, Dec 2013  
Analysis of real vector fields on the sphere using Slepian functions, A. Plattner, F. J. Simons, L. Wei, *IEEE Statistical Signal Processing Workshop*, Ann Arbor, MI, Aug 2012  
Lithospheric magnetic field reconstruction using vector Slepian functions, A. Plattner, F. J. Simons, *Symposium on Study of the Earth's Deep Interior*, Leeds, United Kingdom, July 2012  
Spatiospectral concentration of vector fields on a sphere, A. Plattner, F. J. Simons, *Challenges in Geometry, Analysis, and Computation: High-Dimensional Synthesis*, New Haven, CT, June 2012  
Vector spherical Slepian functions – spatio-spectral concentration of vector fields on the sphere, A. Plattner, F. J. Simons, L. Wei, *AGU Fall Meeting*, San Francisco, CA, Dec 2011

**Teaching:**

**2020**

“The Dynamic Earth”, Department of Geological Sciences, University of Alabama

**2019**

“Introduction Geophysics”, Department of Geological Sciences, University of Alabama

“Hazardous Earth”, Department of Geological Sciences, University of Alabama

“The Dynamic Earth”, Department of Geological Sciences, University of Alabama

**2018**

“Hazardous Earth”, Department of Geological Sciences, University of Alabama

**2017**

“Applied Geophysics”, Department of Earth and Environmental Science, CSU Fresno.

“Natural Disasters and Earth Resources”, Department of Earth and Environmental Science, CSU Fresno.

**2016**

“Geoscientific Computing”, Department of Earth and Environmental Science, CSU Fresno.

“Natural Disasters and Earth Resources”, Department of Earth and Environmental Science, CSU Fresno.

**2015**

“Near-surface geophysics”, Department of Earth and Environmental Science, CSU Fresno.

“Natural Disasters and Earth Resources”, Department of Earth and Environmental Science, CSU Fresno.

**2014**

“Geophysics Seminar”, Department of Earth and Environmental Science, CSU Fresno.

“Environmental Earth and Life Science”, Department of Earth and Environmental Science, CSU Fresno.

**2011–2013**

Instructor for Earth’s environments and ancient civilizations”, Department of Geosciences, Princeton University.

**2006–2011**

Teaching assistant for Numerical modeling in applied geophysics”, Institute of Geophysics, ETH Zurich.

Teaching assistant for field courses (electromagnetic prospecting), Institute of Geophysics, ETH Zurich.

**2004–2006**

Teaching assistant for “Mathematics for natural scientists”, Institute of Mathematics, University of Basel.

**2004**

Teaching assistant for “Linear algebra”, Institute of Mathematics, University of Basel.

**Funding:**

NASA Planetary Science Early Career Award [19-ECA19-0026], 2020–2023

NASA Discovery Data Analysis Program [80NSSC19K1426], 2019–2022

NSF Geoinformatics [EAR-1550732], 2016–2020

NASA Mars Data Analysis Program [NNX14AM29G], 2014–2017

Swiss National Science Foundation Fellowship for Prospective Researchers [PBEZP2-134427], 2011–2012

Ulrich Schmucker Memorial Trust grant (2011)

**Advising:**

Master’s Students:

Alyssa Mills, expected 2021 (University of Alabama)

Yagmur Yilmaz, expected 2021 (University of Alabama)

Marcus Pacheco, 2019 (California State University, Fresno)

Christine Liu, 2018 (California State University, Fresno)

External PhD examiner:

Kathrin Seibert, 2018 (University of Siegen, Germany)

Timothy Wiese, 2012 (University of Adelaide, Australia)

**Service:**

Editor for International Journal on Geomathematics (GEM), since 2019

NASA grant proposal review panelist (2020)

Principal organizer / chair of several AGU sessions (2016 – 2019)

Reviewed numerous papers for the following journals:

*Earth-Sci. Rev.*, *Geophys. J. Int.*, *Geophys. Prospect.*, *Geophysics*, *IEEE T. Signal Proces.*,  
*Intern. J. Geomath.*, *Int. J. Speleol.*, *J. Geodesy*, *J. Geophys. Res.*, *Mech. Res. Commun.*,  
*Pure Appl. Geophys.*, *J. Appl. Geophys.*, *Icarus*

Co-organized the minisymposium “Forward and Inverse Problems in Geodesy, Geodynamics, and Geomagnetism” at SIAM Conference on Mathematical and Computational Issues in the Geosciences, July 2015.

Appeared on the radio show “Science, a candle in the dark” on KFCF <https://itunes.apple.com/us/podcast/science-candle-in-dark-podcast/id972796179>

Presented at the local Café Scientifique <https://valleycafesci.wordpress.com/>